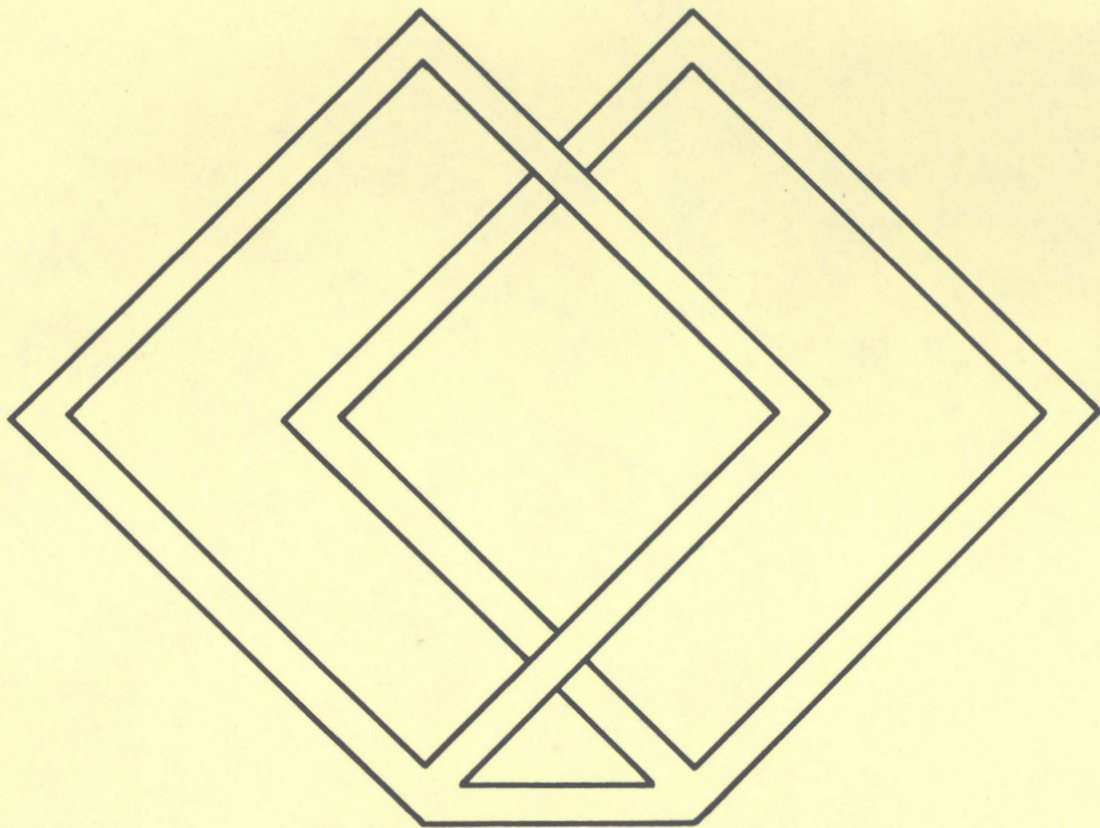


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EDITORIAL

by Frank Gillespie

SOLUTIONS ?

There have been numerous attempts to attribute all UFO phenomena to a single well-defined cause, despite the extreme heterogeneity of UFO events. Some examples are: meteorological phenomena; smugglers; the Federal Hypothesis; imagery; critters; psychic projections; the Phenomenon; meteoric particles; triboluminescence; and earthquake lights. One noticeable feature of these theories is how often they happen to coincide in nature with the theorist's professional specialty.

While it is possible that any or all of these processes contribute to some extent to the overall UFO phenomenon, their originator's claims that each covers the entire gamut of UFO events makes them mutually exclusive. Hence, the probability of any particular one of these theories being completely right, is vanishingly small. It makes sense, therefore, to treat these theories, one and all, as possible minor contributors in a very big field; rather than as major contenders for the ultimate ufological solution.

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THE ALIEN WORLD OF HYDROTHERMAL VENT COMMUNITIES

by John Prytz

Abstract

One of the most significant biological discoveries ever made in recent times was that of the hydrothermal vent community. These deep sea marine assemblages thrive in the immediate vicinity of oceanic hot springs - hydrothermal vents. The hydrothermal vents are found along the axes where great crustal plates are separating - driven apart by convection currents deep in the bowels of the Earth. While finding life on the abyssal ocean floor is old hat, it tends to be incredibly sparse. Hydrothermal vent communities are among the most biologically productive of terrestrially catalogued ecosystems. This is all the more amazing in that hydrothermal vents spew forth biologically toxic substances - sulphides. Apart from this, the significance, especially exobiological significance, is that what has been discovered is an actual example of a biological ecosystem that survives, in fact thrives, independent of solar energy. Photosynthesis plays no role here, which puts the lie to generations of textbook teachings that the sun drives all Earth's ecosystems. Science fiction environments that make use of novel energy systems on alien worlds must now be seen with changed perspectives.

Keywords

Biosphere; chemosynthesis; exobiology; ecosystem; hydrothermal vent community; photosynthesis; marine biology; plate tectonics; seafloor spreading.

If the UFO extraterrestrial hypothesis (ETH) is to continue to remain a viable theory, it behooves ETH advocates to demonstrate that extraterrestrial life is likely to be as abundant in the cosmos as blowflies are at an Aussie barbecue! This I believe has been done, by myself and others, with respect to life-as-we-know-it. That is, alien life which is environmentally and biochemically similar - in origin and evolution - to terrestrial life.

However, the viability of the ETH goes up several orders of magnitude if it can equally be shown that life-not-as-we-know-it is plausible, possible, and indeed, even likely. Readers probably believe that examples of life-not-as-we-know-it can be found only between the pages of science fiction books. Not so. Perhaps Mother Earth herself can serve up an example of life-not-as-we-know-it, as well as the familiar variety! That would be the ideal, given that terrestrial life represents the sum total of any life we have detailed knowledge of.

Now how can it be that we have actual knowledge of life-not-as-we-know-it found here on Earth? That's a seeming contradiction. If it is terrestrial life then it must be life-as-we-know-it! Perhaps I should remind readers though that Planet Earth is a very big place. Big enough in fact to contain many a faraway place with an unusual environment. Perhaps an environment so exotic that it would not be going overboard to call it "alien". Any inhabitants, by analogy, would be akin to life-not-as-we-know-it. Mere words? Judge for yourself after finishing reading this.

I'm sure that readers, if they cast their minds back to their schooldays, will recall that they were taught that all life on Earth was - no matter which pathway you explored - ultimately dependent on sunlight (solar energy). That was because all food ultimately came from green plants which fixed the carbon that made their, hence all, life possible. The green plants converted carbon dioxide to food by tapping sunlight as their (only) energy source. The process, we were taught, was called photosynthesis. Because all food chains started with green plants - the primary producers - all biological communities ultimately depended on their photosynthetic ability. Earth's entire biosphere would collapse if the sun ceased to shine thus producing endless night (even if we still had the sun's warmth without the light). Right? Remember?

Sorry, wrong! Oh the statement used to be right; even today it is 99.9% correct. In terms of significance however, there is more than 0.1 percentage point difference between 99.9 and 100%. In terms of setting the biological world on its ear, such a revolutionary discovery was akin to discovering....well, extraterrestrial life!

Were we to find a fully self-contained biological community that existed independently of the sun and of photosynthesis, that would qualify in my book as a bona fide example of life-not-as-we-know-it. In terms of uniqueness and strangeness value, it would be the equal of discovering life on Mars. Perhaps even Martians wouldn't be as

biologically unique and strange as that discovered in 1977 - on Earth - by a fairly routine geological expedition on a voyage to the bottom of the sea - specifically the Galapagos Rift off the west coast of Ecuador.

If readers cast their minds back again, I'm sure most will recall hearing and/or reading about plate tectonics or seafloor spreading (nee continental drift). Convection currents triggered by the heat deep in the inner earth push huge blocks of crust - the plates - around on the surface. In some parts of the world, these plates are in collision. When plates collide, belts of mountains form, and the borders are active earthquake and volcanic areas. Australia herself is riding a plate being pushed northwards - but I'll be dust several times over before Canberra gets a tropical climate!

Anyhow, in other parts of the world, plates are spreading apart - slowly, very slowly - from Europe and Africa. Other areas of spreading can be found in the Indian and Pacific Oceans. One such area is the East Pacific Rise. The Galapagos Rift is a next door neighbour. These areas, where the Earth is splitting at the seams - literally, as the great plates pull apart - is of obvious interest to marine geologists. This is because subcrustal materials rise to fill the gap, and such materials reveal details of the inner earth's geochemistry that otherwise are totally beyond reach. (Materials get recycled back into the Earth at the boundaries where plates collide.)

But, as it turns out, it is also the areas of active seafloor spreading which happen to be interesting - not only to earth scientists, but, surprise, surprise - to life scientists. Why?

In these tectonically active areas, kilometres under the surface of the ocean hence under tremendous pressure, and in total eternal darkness, life thrives. Here, unlike other areas of the abyssal floor, life does not have to barely manage to eke out a sparse living. What's the difference? The difference is food supply.

Only the top few metres of ocean is transparent enough to allow green marine plants - phytoplankton make up the bulk of marine plants by the way, not seaweeds - to convert sunlight and carbon dioxide into, well, green marine plants! That of course translates into food for the non-photosynthetic fauna - herbivores and carnivores and decomposers. In other words, those top few metres (of primary productivity) end up supporting the diverse marine communities that exist all the way to the bottom of the sea, many kilometres further down. Should you be living on the abyssal bottom, or near to it, you're last in the chow line and meals are few and far between. Most of the goodies have been gobbled up by those organisms that exist at mid-ocean levels as the available food slowly filters down. Thus, the deep ocean floor is akin to a desert.

So why should the hydrothermal vents, the active hot springs located along the axes of seafloor spreading centres, attract abundant marine life communities, such that they are likened to oases within this abyssal desert? It's not the fact that such vents are higher in temperature than the surrounding near-lifeless waters where temperatures register around the 2°C. mark. The upper layers of the Antarctic (Great Southern) Ocean are highly productive - and near freezing to boot!

Food is the key. Or energy. Same thing ultimately. Solar energy > photosynthesis > food is the usual chain as we have already seen. But there is more than one way to skin the food/energy cat. Science fiction writers and even a few scientists have played with hypothetical organisms that utilise all kinds of non-solar energy options - radioactivity, electromagnetism, cosmic rays, etc. These options remain to date just that - hypothetical. Another option was thermal (heat) energy. In a very real sense that energy option is no longer hypothetical. It's been tapped.

As noted above, although the surrounding deep sea temperature hovers around 2°C., the temperature in the immediate vicinity of active hydrothermal vents is much higher - from 20°C. and upwards. Some vents discharge their geochemical contents at temperatures upwards of 250°C. What happens is that seawater flows into the seams where plates are separating. The seawater heats up rapidly, gushing back up akin to a geyser, not only hotter but laden with minerals and dissolved gases. These submarine geysers can't actually boil of course due to the extreme pressure caused by the overlying kilometres of water. The ultimate driving force then is geothermal heat. Heat from inside the Earth caused mainly by the decay of radioactive elements incorporated into the Earth when the planet formed some 4.5 billion years ago. Heat energy that is independent of the sun. Without this, nothing below would follow on.

This is not to say that the marine life around these hydrothermal vents directly

taps thermal energy. But it is not just heat brought up. The Earth is disgorging under the deep sea materials - minerals and gases. One of the common substances brought up from the bowels of the Earth is sulphur - or sulphur compounds (sulphurous and sulphuric). One of the common sulphur compounds is hydrogen sulphide! But wait. Isn't hydrogen sulphide a deadly poison, toxic to all living things? Wouldn't that be the environmental coup de grace?

Lesson: do not underestimate life's ability to adapt to adverse conditions. What's one man's poison is another man's food.

As the Newcastle Song puts it, "don't you ever let a chance go by". Some bacteria have taken an environmental liability and turned it into an environmental asset via making it a personal asset. You see, some bacteria love sulphur as much as you and I love pizza and beer (would you believe milk and cookies? Meat and potatoes? Oh well, you know what I mean!). These bacteria have evolved the ability to fix carbon into their tissues from carbon dioxide (dissolved in seawater), not by utilising sunlight as an energy source (there is no sunlight), but from the chemical energy stored in hydrogen sulphide (and other similar compounds). The result? Hydrothermal vents are the fast food outlets of the abyssal ocean floor!

Although it is now known that such sulphur-loving bacteria are not confined exclusively to the hydrothermal vent provinces, these bacteria that "feed" on chemicals directly (chemosynthesis, not photosynthesis) in turn provide food for abyssal herbivores. One finds clams and mussels in abundance around hydrothermal vents - they filter the bacteria from the water. Some other unique marine tube worms form symbiotic relationships with the bacteria. Of course, marine carnivores in their turn live off the herbivores. Many of these marine organisms are quite unique to science and hydrothermal vent environments. Most have evolved highly weird and wonderful ways of dealing with life's problems in this environment. There is not space to go into details about these. In fact to do so would be to go beyond the patience of readers who, after all, are interested in UFOs, not clams and tube worms! However, to cater for those who might like to pursue this subject, I have provided a post-article bibliography.

And so back to ufology and the ETH. (I know parallels have been drawn between inner space and outer space, but this connection takes the proverbial cake!)

Once the limiting factor inherent in the restrictions imposed by photosynthesis is broken, with respect to potential environments where life could have originated and evolved, it's a brand new ball game. The potential sites for extraterrestrial life have doubled, tripled, even multiplied tenfold. In fact, one more Earth-centred, planetary-chauvinistic bond has been shattered. From there, it could be a chain reaction!

In fact, one has to look no further than our own solar system for potential relevance. All of the Jovian planets (Jupiter, Saturn, Uranus and Neptune) are analogous, as are several of their satellites (Jupiter's Europa and Ganymede, and Saturn's Titan and Enceladus). In these remote regions of the solar system you do not have conditions ripe for a biosphere that is dependent upon solar energy and photosynthesis. You do though have environments that are rich in biologically suitable chemicals. You have environments that contain internal heat sources. You have environments that are probably, or actually are, geologically active. If this "close" to home, then no doubt similar environments exist around the gas giants that circle alien suns. In fact, many mathematical simulations suggest that the gas giant (Jovian type) planets are the normal retinue of extra-solar planetary systems.

Other possibilities are the projected rogue planets that drift through interstellar space, independent of any parent star. Should they have a suitable chemistry, and an internal heat source....then....well, who knows. But perhaps that science fiction novel, centred around that "impossible" planetary biosphere, deserves just that extra passing thought and reflection after you finish reading the last page and close the cover!

In summary, it is probably no longer exobiological heresy to suggest seriously that many other (non-photosynthetic) energy sources have been tapped to form the base of ecosystems and biospheres throughout the universe. Perhaps one or more of these, one day, will be linked to at least part of the terrestrial UFO phenomenon.

FOR FURTHER READING

The Environment

- Cann, J.R. & Strens, M.R. - "Black smokers fuelled by freezing magma" - Nature, 8 July 1982 - p.147-149.
- Clark, D.L. - "ANGUS: eyes in the deep" - Oceans, Nov. 1979 - p.42-45.
- Corliss, J.B. et.al. - "Submarine thermal springs on the Galapagos Rift" - Science, 16 March 1979 - p.1073-1083.
- Edmond, J.M. - "Hydrothermal activity at mid-ocean ridge axes" - Nature, 12 March 1981 - p.87-88.
- Edmond, J.M. & Von Damm, K. - "Hot springs on the ocean floor" - Scientific American, April 1983 - p.78-84, 86, 88-93.
- Edmond, J.M. et.al. - "Chemistry of hot springs from the East Pacific Rise and their effluent dispersal" - Nature, 20 May 1982 - p.187-191.
- Hekinian, R. et.al. - "Sulfide deposits from the East Pacific Rise near 21°N." - Science, 28 March 1980 - p.1433-1444.
- Herrman, L. - "Alien worlds on the ocean floor" - Science Digest, April 1981 - p.52-57+.
- Lonsdale, P. - "Deep-sea hydrothermal site on a strike-slip fault" - Nature, 18 Oct. 1979 - p.531-534.
- Macdonald, K.C. - "Oceanic hot springs" (in) - McGraw-Hill Yearbook of Science & Technology: 1982/1983 - McGraw-Hill, N.Y. - 1982 - p.56-67.
- Macdonald, K.C. & Luyendyk, B.P. - "Crest of the East Pacific Rise" - Scientific American, May 1981 - p.100-108, 110, 112-114, 116.
- Mottl, M.J. - "Submarine hydrothermal ore deposits" - Oceanus, Summer 1980 - p.18-27.
- Orcott, J. - "Geology of the deep-sea vents" - New Scientist, 10 Dec. 1981 - p.743.
- "Research dives probe the Galapagos Rift" - Science News, 19 March 1977 - p.182.
- Spiess, F.N. et.al. - "East Pacific Rise: hot springs and geophysical experiments" - Science, 28 March 1980 - p.1421-1433.
- "Strange world without sun" - National Geographic, Nov. 1979 - p.680-688.
- West, S. - "Smokers, red worms and deep sea plumbing" - Science News, 12 Jan. 1980 - p.28-30.

The Biology

- Arp, A.J. & Childress, J.J. - "Blood function in the hydrothermal vent vestimentiferan tube worm" - Science, 17 July 1981 - p.342-344.
- Ballard, R.D. & Grassle, J.F. - "Return to oases of the deep" - National Geographic, Nov. 1979 - p.689-705.
- Baskin, Y. - "Earth: life at the rift" - Omni, Oct. 1982 - p.18, 192.
- Cavanaugh, C.M. et.al. - "Prokaryotic cells in the hydrothermal vent tube worm Riftia pachyptila Jones: possible chemoautotrophic symbionts" - Science, 17 July 1981 - p.340-342.
- Corliss, J.B. & Ballard, R.D. - "Oases of life in the cold abyss" - National Geographic, Oct. 1977 - p.440-453.
- "Dinner at the rift" - Scientific American, Oct. 1981 - p.89-90.
- Enright, J.T. et.al. - "Deep-ocean hydrothermal vent communities" - Nature, 22 Jan. 1981 - p.219-221.
- Felbeck, H. - "Chemoautotrophic potential of the hydrothermal vent tube worm Riftia pachyptila Jones (Vestimentifera)" - Science, 17 July 1981 - p.336-338.
- Felbeck, H. et.al. - "Calvin-Benson cycle and sulphide oxidation enzymes in animals from sulphide-rich habitats" - Nature, 24 Sept. 1981 - p.291-293.
- Fry, B. et.al. - "Sulphur isotopic compositions of deep-sea hydrothermal vent animals" - Nature, 3 Nov. 1983 - p.51-52.
- "Giant deep sea worm discovered" - BioScience, June 1979 - p.384.
- "Giant of the Galapagos Rift" - Science News, 7 April 1979 - p.231.
- Golden, F. - "Strange creatures of the deep" - Time (Australian edition), 24 May 1982 - p.80. (US edition - 14 May 1979 - p.127+.)

- Grassle, J.F. et.al. - "Galapagos '79: initial findings of a deep-sea biological quest" - Oceanus, Summer 1979 - p.2-10.
- Gwynn, P. & Hager, M. - "Gems from the deep" - Newsweek (Australian edition), 14 May 1979 - p.58-59. (US edition - 14 May 1979 - p.127+.)
- Hand, S.C. & Somero, G.N. - "Energy metabolism pathways of hydrothermal vent animals: adaptations to a food-rich and sulphide-rich deep-sea environment" - Biological Bulletin, Aug. 1983 - p.167-181.
- Hessler, R. - "Oasis under the sea - where sulphur is the staff of life" - New Scientist, 10 Dec. 1981 - p.741-742, 744, 746-747.
- Jannasch, H.W. & Wirsén, C.O. - "Chemosynthetic primary production at East Pacific sea floor spreading centers" - BioScience, Oct. 1979 - p.592-598.
- Jones, M.L. - "Riftia pachyptila Jones: observations on the vestimentiferan worm from the Galapagos Rift" - Science, 17 July 1981 - p.333-336.
- Karl, D.M. et.al. - "Deep-sea primary production at the Galapagos hydrothermal vents" - Science, 21 March 1980 - p.1345-1347.
- Killingley, J.S. et.al. - " $^{18}\text{O}/^{16}\text{O}$ variations in deep-sea carbonate shells from the Rise hydrothermal field" - Nature, 18 Sept. 1980 - p.218-221.
- Krishnamurthy, S. - "Hydrothermal vents and light-independent living systems" - Journal of Chemical Education, Dec. 1981 - p.981.
- "Life without sun" - Astronomy, April 1980 - p.60-61.
- McCosker, J.E. - "In utter darkness" - Oceans, Nov. 1979 - p.22-25+.
- "Oceanic oddities: venting surprises" - Economist, (British), 6 Dec. 1980 - p.96.
- Rau, G.H. - "Hydrothermal vent clam and tube worm $^{13}\text{C}/^{12}\text{C}$: further evidence of nonphotosynthetic food sources" - Science, 17 July 1981 - p.338-340.
- Rau, G.H. - "Low $^{15}\text{N}/^{14}\text{N}$ in hydrothermal vent animals: ecological implications" - Nature, 5 Feb. 1981 - p.484-485.
- Rau, G.H. & Hedges, J.I. - "Carbon-13 depletion in a hydrothermal vent mussel: suggestion of a chemosynthetic food source" - Science, 16 Feb. 1979 - p.648-649.
- Sedgwick, J. - "Fred Grassle dives to a strange new world" - International Wildlife, Nov./Dec. 1980 - p.49-53.
- Simon, C. - "Deep-sea oasis" - Science News, 19 June 1982 - p.410-413.
- "Sunless cycle" - SciQuest, Dec. 1981 - p.24.
- "Tube worm nourished with help from within" - Science News, 18 July 1981 - p.38.
- Turekian, K.K. et.al. - "Growth rate of a clam from the Galapagos Rise hot spring field using natural radionuclide ratios" - Nature, 2 Aug. 1979 - p.385-387.
- Williams, P.M. et.al. - "Dietary carbon sources of mussels and tubeworms from Galapagos hydrothermal vents determined from tissue ^{14}C activity" - Nature, 30 July 1981 - p.448-449.
- Wittenberg, J.B. et.al. - "Hemoglobin kinetics of the Galapagos Rift vent worm Riftia pachyptila Jones (pogonophora; vestimentifera)" - Science, 17 July 1981 - p.344-346.

Stop Press: Late Entries

- Lutz, R.A. - "Deep-sea hydrothermal vents: cases on the ocean floor" (in) - Encyclopaedia Britannica Yearbook of Science and the Future: 1985 - Encyclopaedia Britannica, Inc., Chicago, Illinois - 1984 - p.226-242.
- Rona, P.A. et.al. (Editors) - Hydrothermal Processes at Seafloor Spreading Centers - Plenum, N.Y. - 1984.

INTERNAL AND EXTERNAL ORIGINS OF UFOS

by Mark Moravec

Several articles in the ACUFOS Journal have debated whether UFOs represent the manifestation of an internal intelligence (hallucinatory projections of the human mind, for example) or an external intelligence (extraterrestrial visitors, perhaps). Several points can be stressed in response to this debate.

Multiple Origins

Firstly, I support the view that it doesn't have to be an "either/or" situation. UFO phenomena may be reports of events which have a variety of origins, both internal and external. Some UFO cases involve physical traces, radar recordings and other objective manifestations. These cases appear to have primarily external, physical causes, though these causes do not necessarily have to be exotic or intelligent. (However, note that "physical evidence" cases also have a subjective overlay due to the processes of human eyewitness testimony and human interpretation of the data.) Some UFO cases, including many or all entity, abduction and contactee accounts, involve reports of images, sounds and other sensations which have characteristics similar to hallucinatory experiences induced by drugs, isolation and other triggers. These cases appear to have primarily internal, subjective causes. (Some of these cases may also have an initial, objective stimulus such as a star or planet, which perception is subsequently elaborated upon.) Any line of debate which reduces the argument to internal only versus external only origins is bound to fall down, because UFOs may well be a mixture of both.

External but Not Intelligent

Secondly, given some UFO phenomena do have external causes, it may be a mistake to prematurely assume that these external causes necessarily have to be intelligent. Most UFO physical trace reports have a variety of natural or mundane origins, such as fungal rings, lightning strikes and hoaxes. If there is a residue of currently unexplained physical traces, we need not automatically assume that extraterrestrials are responsible. We still have much to learn about the meteorological and geophysical phenomena of our natural world. Do we really know enough about the parameters of natural phenomena to be able to exclude some manifestations of ball lightning, earthquake lights, tornado lights, etc. as possible causes for some anomalous UFO reports? The earthquake generated UFO

lights hypothesis currently suffers from a lack of solid supporting evidence (as does the extraterrestrial hypothesis). But other natural phenomena possibilities may exist.

In his excellent study of UFOs and IFOs, The UFO Handbook (pp 120-121), Allen Hendry describes a "good CE2" case involving a red ball of fire which drifted against the wind in a wobbling motion for several minutes, then dropped down to a person's lawn. The object was seen in its airborne phase by eleven witnesses in six separate parties; a large burnt patch of ground and three indentations were found; radioactivity was detected by a Geiger counter (but not by a subsequent, more sophisticated test); analyses showed no evidence of hydrocarbons (which would be expected if the trace was caused by burning petrol); and a check with NORAD disclosed no record of a re-entry. A wonderful case with multiple, independent witnesses and exotic physical traces, yet it may all have been caused by ball lightning. And if there are any physical trace cases inexplicable in terms of natural phenomena, there are other hypotheses that need to be explored (e.g. secret military experiments) before we can conclude that alien intelligence was involved.

Extraterrestrial Speculations and the Burden of Proof

The proponents of the extraterrestrial hypothesis often discuss the probability of the existence of intelligent life elsewhere in the universe, as estimated by such devices as the Drake equation. But such "equations" contain many unknown quantities and different commentators have come up with widely divergent "guestimates". Perhaps we do live in a "Star Trek" universe populated by humanoids bearing a remarkable resemblance to Hollywood extras. Or perhaps we are the only example of intelligent life in the universe. The plain fact is that we just don't know. And it requires more than guesswork to prove the existence of extraterrestrial intelligence.

One of the reasons that the extraterrestrial hypothesis is so seductive is that there is no apparent way of stating the hypothesis in such a way that it can be tested and disproved. We might eventually succeed in exploring our entire galaxy without finding any trace of intelligent extraterrestrial life. Yet one could always say - "maybe in another galaxy" - "maybe in another parallel universe"... And if the uni-

verse be infinite, it may be that the ETH could never be absolutely discounted. The question arises, is such a generalised speculation of any practical use in ufology?

I would suggest that the basic facts of ufology are: that UFO reports exist; that approximately 90 percent of UFO reports are easily explicable in terms of natural and man-made phenomena; and that of the remaining 10 percent, there appears to be a variety of internal/subjective and external/physical causes. Beyond this lies a number of possibilities.

This leads us to a consideration of the burden of proof. If some UFO phenomena are caused by an external intelligence, it is up to the proponents of such an idea to

come up with solid evidence to support this notion. It is a great leap between concluding that an event is anomalous to concluding that it was caused by alien intelligence. I can't explain the 1966 Tully observation and associated ground effect, but neither can I assume an extraterrestrial cause in the absence of further unambiguous data.

If UFOs are extraterrestrial, where are the cases that prove this? It is not sufficient for such cases to have the appearance of being exotic. The cases have to be thoroughly documented; they have to be inexplicable in terms of natural phenomena; they have to indicate an intelligence at work; and they have to indicate that this intelligence is alien. Do such cases exist?

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A 1913 "UFO" INCIDENT

by John Prytz

Many people think today's UFO (nee "flying saucer") enigma only became established fairly recently - World War Two vintage, on or about. For all practical purposes, that's true. But, there have been pre-WWII incidents that could just as easily have been "identified" as "UFO" in nature.

These historical UFO incidents are important in that the farther back in time one goes, the more and more artificial (man-related) explanations have to go by the board. Readers probably know of the Biblical "Wheel of Ezekiel" UFO; the 1908 Siberian Tunguska "Meteorite" UFO; the American "airships" UFO mystery of the late 1890s; and perhaps even of Australia's Nineteenth Century UFO, the 1868 Parramatta, N.S.W. "machine to go through the air" close encounter. These documented incidents must be explainable without resorting to the modern standbys of misidentified jet aircraft, rocket launches, orbiting or decaying artificial satellites, nuclear explosions in the atmosphere, skyhook balloons, etc.

Although the above historical UFO incidents are intriguing, on the 9th of February, 1913, a far lesser known "UFO" incident occurred. When I read of it, it seemed to me that here was a case that would be on a par with the most anomalous of modern at-a-distance UFO sightings ever made. Further, it has the "advantage" of being an historical incident, thus narrowing down the range of explanations one can logically assign to this event, without,

at the same time, being so old that one can question the accuracy of the witnesses and the facts.

I couldn't come up with any obvious artificial or natural acceptable explanation, despite the fact that the scientifically accepted obvious explanation, like in the Tunguska "Meteorite" case, must have been natural in origin, and specifically within the category we term "meteor fireballs". Must? Well, the category "UFO" didn't exist in 1913.

This incident has been extensively written up in the scientific literature, for example in Nature, Popular Astronomy, and in the Journal of the Royal Astronomical Society of Canada, without achieving the popular fame of, say, Tunguska. I present the bare facts here that relate to the case in question - you decide what explanation fits!

During the early evening (in the first instance) of the 9th of February, 1913, a procession of from 30 to 60 "meteor fireballs" traversed the clear winter skies of North America before heading out over the Atlantic Ocean. This rather large number of "meteor fireballs" travelled from roughly the northwest, heading southeast. The procession was first seen in Saskatchewan, hence Manitoba, Minnesota, Michigan, Ontario, New York, Pennsylvania, New Jersey, hence out to sea, to be picked up again over Bermuda. The last sighting was from a ship, the s.s. Newlands, some 3 degrees over the equator in

the South Atlantic (at longitude 32° W), with the objects still going strong. That would put the flight path at over 5,600 miles (minimum) with computations suggesting a likely traverse of several thousand miles more! Such an extended trajectory is without parallel in modern observational meteorics.

The objects, whatever they were, would have had to have been on a path concentric, or nearly so, with the Earth's surface. Thus, and as was observed at the time, these "meteor fireballs" moved on an apparently perfectly horizontal path. If natural, they were, briefly at least, terrestrial satellites.

Thus far there has been nothing to strain credence beyond the breaking point. But, the objects also moved, not in the usual quick-smart fashion associated with meteors, but very slowly. It took, based on over 140 reports (mainly from Canada), 20 to 40 seconds for one grouping of these "meteor fireballs" to traverse the sky - horizon to horizon - and 3 to 6 minutes for the entire series of groupings to complete their celestial parade. Nor did these objects, as meteors are wont to do, scatter. All the objects within a grouping stayed together; all the groupings moved in stately manner through practically the exact same path across the sky.

Groupings? Yes! The objects were bunched in groups of twos, threes, or fours. The objects within each group flew abreast of one another in perfect formation. As soon as one group disappeared over the southeast horizon, another group would appear 180 degrees opposite. Sometimes two groups would be visible at the

same time. Witnesses compared this extraordinary "meteor fireball" display as akin to a series of individual battleships, each surrounded by an escort of destroyers, or, to a brilliantly lit passenger train travelling in sections, because of this regular order and movement. Except of course, in this case, the objects were travelling in the sky, not on the surface of the water, nor over land. Then, as now, it would appear on the surface as if there was some sort of "intelligence" behind the phenomenon.

What did these "meteor fireballs" look like? Apparently the lead body (or group of bodies - there is some witness uncertainty) was golden-yellow to fiery-red in colour (not white), with a bright and long tail(s). Subsequent groupings had less and less lengthy and luminous tails. The objects were compared to bright stars, even Venus (understandable as the altitude was computed as being in excess of 40 miles), though the Moon was also used in an analogy.

So what were these objects? In the words of the then well-known astronomer William H. Pickering, "This remarkable phenomenon was in no sense a meteoric shower. It was a different kind of event altogether..." What kind of event has yet to be determined. It doesn't smack of the natural - the odds against would be "astronomical". Yet, it couldn't be (terrestrially) artificial - not in 1913.

I would wager that had the event occurred some half century later, the tag "UFO" would have been made, and would not have been inappropriately applied either.

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LETTER TO THE EDITOR

Sir,

I congratulate Frank Gillespie on his reply (ACUFOS Journal Jan/Feb 1985) to my article "Nocturnal lights are important too". It is a well thought out and valuable contribution to the issue at hand. As a keen supporter of the ETH, I hope he's more correct than I. However, I do not agree with all parts of Frank's article. Nevertheless, I do not intend to reply in turn. I think I've said enough on this topic - at least for the near future. Instead I urge normally lazy ACUFOS Journal readers to get off your backsides, put pen to paper, and join in this debate by making a contribution. Your ideas and input would be every bit as valuable as mine or Frank's. There is nothing to be gained by gnashing your teeth in private and sticking pins in J.P. and/or F.G. dolls!

John Prytz

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UFOS - AFRICAN ENCOUNTERS

Author: Cynthia Hind
 Publisher: Gemini

reviewed by Frank Gillespie

Very little African UFO news ever penetrates to the outside world, so Cynthia Hind's review of close encounter cases is very welcome. The book is generally well written, in most cases from the point of view of the author's own involvement. She presents the facts as she found them; but the result is not the boring recital of events and statistics which you might expect. I recommend this book as compulsory reading for all UFO investigators; but before you rush out and buy your copy, read on. All is not as it seems.

The most serious flaw in the author's presentation is a lack of care in tying up loose ends. Of particular interest to me are the discrepancies between the text and the illustrations. In one case, there is no mention of photographs being taken of markings in *"terribly hard ground"*, yet two photographs are included - obvious fakes, with the marks scraped in loose powdery soil. In the next case, considerable text is devoted to a series of photographs (pronounced "not genuine" by Ground Saucer Watch), yet not one appears in the book. Another photograph is claimed to show an object with an aspect ratio (measured by GSW) of 1 to 5, whereas the depicted object is obviously about 1 to 1. No explanation is given for peculiar stripes which appear in the background of this picture. Photographs of a damaged tennis court show an irregular row of large erratic holes in the surface, but these were reported as being *"so even"*, as well as equidistant from each other. Two trees (not photographed) alongside the court were said to have developed foliar burns, eventually dying; but no mention is made of shrubs photographed at one end of the court, quite close to the damaged area. In another case, what is described as *"a fairly large depressed site"*, with flattened *"grass and small trees"*, appears in a photograph to be a small tree-free area, with substantially undamaged lush grass growth. The photographs are claimed to be *"excellent"*, so presumably one should believe what they show.

There are three contactee stories in the book, and quite obviously, Cynthia Hind would love us to believe all three. However, there are some fundamental incompatibilities between the stories, to the extent that belief in any one precludes the possibility of belief in either of the others. This mutual exclusivity covers the topics of motive, power sources, travel techniques, communication, origin, reproduction and life span, so all three cases must be regarded with the deepest suspicion. These contactee episodes have many characteristics in common with other CE3 accounts - carrot and stick type promises and threats to mankind, pseudo-technical gobbledegook, and violations of the TANSTAAFL (There Aint No Such Thing As A Free Lunch) principle. The stories are incredible, but even more so is the lack of good investigation. Elizabeth Klarer's claim to pregnancy followed by off-world delivery could surely be checked; both her condition and whereabouts should be a matter of record. Peter and Frances made considerable mileage out of a supposed one-hour time lapse; but I was able to determine from an atlas that they had merely entered another time zone. Edwin's 'broadcasts' were routinely recorded on a permanently installed tape recorder; and I would be prepared to wager a considerable sum that nobody has thought to check the tape recorder, to see if it really plays back when it appears to be recording.

The standard of case investigation in this book is uniformly low. In July 1975, Venus was a prominent evening object in the west, and it appears to have triggered a flap of considerable extent in Zimbabwe. Altogether, about half of the flap cases were probably caused by Venus; and it is rather significant that not one of the witnesses is reported to have seen Venus as well as the UFO. One of these Zimbabwe events was explained by Salisbury Air Traffic Control as *"a partial eclipse of either Mars or Venus"*. Since the only objects which can eclipse those two planets are our sun and moon, this must surely rank as the most ridiculous UFO 'explanation' ever.

Cynthia Hind gives the impression that she is reporting events accurately and fairly, but one story rather dents this image. She includes a brief account of the 1978 Kaikoura (New Zealand) events - a case which must surely be the most investigated and best documented of all time. Mrs Hind has the right place and date, the right aircraft, and the right pilot and first officer, but that is about all! I certainly hope that the rest of her cases were obtained from more reliable sources than this one.

Yes, I am recommending this book for UFO investigators to study - as an example of just about every possible mistake which can be made by a well-meaning but untrained amateur. Mrs Hind would do well to study some of the excellent ufologist training manuals now available; as would many others who find themselves being made into 'instant experts' by overenthusiastic media representatives. Persons who are wrongly regarded as experts have a moral duty to try and become experts, especially before they start writing books on the subject of their 'expertise'. Otherwise, the inevitable result is books such as this. Read it - and weep!

Compiler's Note: Many references have been given to the concepts of space flight and the colonization of space. To date, the usual ways and means of planetary colonization have centred around engineering artificial structures that shield the inhabitants from the hostile outside extraterrestrial environment - mini-Earth, bubble-enclosed, space-city habitats built and maintained at great cost and inconvenience. In contrast to those scenarios are the visions of science fiction writers who suggest that entire otherwise hostile planets can be "naturally" transformed into carbon-copy Earths. All the evolutionary process needs is a bit of a push in the right direction from man - the ultimate mastery of nature. This concept, called environmental or planetary engineering, is now taken seriously by scientists who now see - with hindsight - the massive sort of impact man has had, and has obviously the potential to have, in respect to altering the Earth's environment on a large scale - whether on purpose or inadvertently. Can Mars or Venus be made into Earths? The answer is "yes", if we want to do it. However, I personally am of the opinion that in the long term - and planetary engineering is long term - it is more practical, faster and less costly to construct artificial space colony worlds in space than it is to either alter a planet's natural environment to that of standard Earth or build bubble-enclosed cities on these planets. Space colonies are more versatile, more controllable, more expandable, and cheaper to build and operate than high gravity planetary surface cities. However, my opinions aside, to complement the references to other forms of colonization I present this bibliography on planetary engineering - commonly termed now by the word "terraforming".

Terraforming: General - Monograph

- 1) Oberg, J. - New Earths: Restructuring Earth and Other Planets - Stackpole, Harrisburg, Pennsylvania - 1981.

Terraforming: General - Book Extract

- 1) Oberg, J. - "Terraforming" (in) - Hart, M.H. & Zuckerman, B. (Editors) - Extraterrestrials: Where Are They? - Pergamon Press, N.Y. - 1982 - p.62-65.

Terraforming: General - Journal Articles

- 1) Adelman, B. & Adelman, S.J. - "Case for planetary engineering" - Space World, June/July 1982 - p.20-21.
- 2) Hamil, R. - "Terraforming the Earth" - Analog, July 1978 - p.47-65.
- 3) Hardy, D.A. - "Terraforming" - Space Voyager, Oct./Nov. 1983 - p.38-43.
- 4) Oberg, J. - "Farming the planets" - Omni, Feb. 1979 - p.58-61, 108, 110-111.
- 5) Oberg, J. - "In Earth's image: could man create new worlds in space?" - Omega, July/Aug. 1982 - p.6-9. (Also in: Science Digest, Feb. 1982 - p.86-89.
- 6) Oberg, J. - "Terraforming" - Astronomy, May 1978 - p.6-25.
- 7) "Planetary engineering: building new homes in space" - Futurist, April 1982 - p.78, 81-82.
- 8) von Puttkamer, J. - "In Earth's image: the terraforming of other planets" - Future Life, March 1979 - p.54-55.

Terraforming: Venus - Book Extract

- 1) Pournelle, J. - "Big rain" (in) - Step Farther Out - Ace, N.Y. - 1980 - p.89-99.

11. Terraforming: Venus - Journal Articles

- 1) Pournelle, J. - "Step further out: the big rain" - Galaxy, Oct. 1974 - p.54-60 (or, Sept. 1975 - refs differ).
- 2) Prytz, J. - "Applied exobiology" - Space World, Nov. 1971 - p.34-35.
- 3) Sagan, C. - "Planet Venus" - Science, 24 March 1961 - p.849-858.

Terraforming: Mars - Monographs

- 1) Allaby, M. & Lovelock, J.E. - Greening of Mars - Andre Deutsch, London - 1984.
- 2) Avener, M.M. & MacElroy, R.D. - On the Habitability of Mars - An Approach to Planetary Ecosynthesis - NASA (SP-414), Washington, D.C. - 1976.

Terraforming: Mars - Book Extract

- 1) Oberg, J. - "Terraforming" (in) - Mission to Mars: Plans and Concepts for the First Manned Landing - Meridian/New American Library, N.Y. - 1982 - p.192-197.

Terraforming: Mars - Journal Articles

- 1) Burns, J.A. & Harwitt, M. - "Towards a more habitable Mars - or - the coming Martian spring" - Icarus, v.19, 1973 - p.126-130.
- 2) Robinson, A.L. - "Colonizing Mars: the age of planetary engineering begins" - Science, 18 Feb. 1977 - p.668.
- 3) Sessions, L. - "Could Mars be made a second Earth?" - Omega, July/Aug. 1981 - p.20-21.
- 4) Sessions, L. - "Preparing Mars for life" - Science Digest, Nov./Dec. 1980 - p.128-129.

BIBLIOGRAPHY UPDATES

Sagan, C. - Monographs By

- 1) Sagan, C. et.al. - Cold and Dark: The World After Nuclear War - Sidgwick & Jackson, London - 1984.

Sagan, C. - About

- 1) Rovin, J. - "Carl Sagan's Cosmos" - Omni, Sept. 1980 - p.104-107.

Cosmic Chemistry

- 1) Chaikin, A. - "Stars: cosmic dust" - Omni, March 1983 - p.158.
- 2) Lemonick, M. - "Chemicals of life in space" - Omega, Nov./Dec. 1984 - p.8.

Panspermia - Monograph

- 1) Hoyle, F. - Evolution From Space (the Omni Lecture) - University College Cardiff Press, Cardiff, Wales - 1982.

Panspermia - Journal Articles

- 1) Hoyle, F. - "From virus to cosmology" - Journal of the Royal Society of Medicine, v.76, no.2, 1983 - p.99-111.
- 2) Kvenvolden, K.A. et.al. - "Evidence for extraterrestrial amino acids and hydrocarbons in the Murchison Meteorite" - Nature, v.228, 1970 - p.923.
- 3) Parkes, A.S. & Smith, A.U. - "Transport of life in the frozen or dried state" - British Medical Journal, May 1959 - p.1295-1297.
- 4) Pirie, N.W. - "Possible impact of cosmochemistry on terrestrial biology: historical introduction" - Philosophical Transactions of the Royal Society of London, A, v.303, no.1480, 1981 - p.589-594.
- 5) Ponnampuruma, G. - "Organic compounds in the Murchison Meteorite" - Annals of the New York Academy of Sciences, v.194, (3 May) 1972 - p.56-70.

Fanspermia - Journal Articles (cont)

- 6) Studier, M. et.al. - "Organic compounds in carbonaceous chondrites" - Science, 24 Sept. 1965 - p.1455-1459.
- 7) Whittet, D.C.B. - "Bacteria in space: the great debate" - Astronomy, May 1984 - p.60+.

Planetary Contamination & Quarantine: Jovian Planets/Satellites

- 1) Strand, L. - "Jupiter: the probe they call 'dirty'" - Omega, Nov./Dec. 1984 - p.14-17, 125.

Life in the Solar System: General

- 1) Drake, W.R. - "Mercury, Jupiter, and others: can life exist?" - Flying Saucer Review, Sept./Oct. 1960 - p.18-22.
- 2) "Limits of organic life in our solar system" - American Review of Reviews, Feb. 1911 - p.242-243.
- 3) Oro, J. et.al. - "Criteria for emergence and evolution of life in the solar system" - Origins of Life, v.12, no.3, 1982 - p.285-305.

Life in the Solar System: Venus

- 1) Maney, C.A. - "Is Venus inhabited?" - Flying Saucer Review, Sept./Oct. 1965 - p.6-8.
- 2) Moore, P. - "Paradise lost" - Omni, March 1979 - p.26.

Life in the Solar System: The Moon - Transient Lunar Phenomena (TLP)- Book Extracts

- 1) Corliss, W.R. - "Those lights on the Moon" (in) - Some Mysteries of the Universe - Adams & Charles Black, London - 1969 - p.161-183.
- 2) Kopal, Z. - "Luminescence of the Moon and solar activity" (in) - Hess, W.M. et.al. -(Editors) - Nature of the Lunar Surface: Proceedings of the 1965 IAU-NASA Symposium - John Hopkins Press, Baltimore, Maryland - 1966 - p.173-183.

- Journal Articles

- 1) "Another lunar color phenomenon" - Sky & Telescope, Jan. 1964 - p.3.
- 2) "Are there changes on the Moon?" - Sky & Telescope, July 1964 - p.3.
- 3) Ashbrook, J. - "Linne in fact and legend" - Sky & Telescope, Aug. 1960 - p.87-88.
- 4) Bispham, K. - "Schroter and lunar transient phenomena" - Journal of the British Astronomical Association, v.78, 1968 - p.381.
- 5) Botley, C.M. - "TLPs and solar activity, and other phenomena" - Journal of the British Astronomical Association, v.86, 1976 - p.342-343.
- 6) Cameron, A.G.W. - "Report on the ALPO lunar transient phenomena observing program" - Journal of the Association of Lunar & Planetary Observers, Sept. 1974 - p.1-14.
- 7) "Changes on the Moon's surface" - Nature, v.66, 1902 - p.40-41.
- 8) "Charting by blinks: lunar color phenomena" - Science News Letter, 30 May 1964 - p.338.
- 9) "Color changes on the Moon" - Chemistry, Jan. 1968 - p.31.
- 10) Flamm, E.J. et.al. - "Lunar luminescence" - Nature, v.205, 1965 - p.1301-1303.
- 11) Giddings, N.J. - "Lightning-like phenomena on the Moon" - Science, v.104, 1946 - p.146.
- 12) "Glowing lunar enigma" - Science Digest, March 1981 - p.24.

Life in the Solar System: The Moon - Transient Lunar Phenomena (TLP)- Journal Articles (cont)

- 13) Goddard, A.V. - "Unusual lunar phenomenon" - Popular Astronomy, v.40, 1932 - p.316-317.
- 14) Gorenstein, P. & Bjorkholm, P. - "Detection of radon emanation from the crater Aristarchus by the Apollo 15 alpha particle spectrometer" - Science, 23 Feb. 1973 - p.792-794.
- 15) Greenacre, J.A. (+) Hall, J.S. - "Recent observation of lunar color phenomena" - Sky & Telescope, Dec. 1963 - p.316-317.
- 16) "Japanese saw pink patch on the Moon" - New Scientist, v.22, 1964 - p.334.
- 17) Kopal, Z. & Rackham, T.W. - "Excitation of lunar luminescence by solar activity" - Icarus, v.2, 1963 - p.481-500.
- 18) Kopal, Z. & Rackham, T.W. - "Lunar luminescence and solar flares" - Sky & Telescope, March 1964 - p.140-141.
- 19) Kozyrev, N.A. - "Observation of a volcanic process on the Moon" - Sky & Telescope, April 1959 - p.307. (Discussion: Aug. 1959 - p.561.)
- 20) Kozyrev, N.A. - "Volcanic phenomena on the Moon" - Nature, 8 June 1963 - p.979-980.
- 21) Laurence, W.L. - "Volcanoes on the Moon?" - Science Digest, April 1959 - p.70-72.
- 22) "Lively Moon?" - Scientific American, June 1959 - p.78.
- 23) "Lively Moon: five U.S. astronomers see transient luminous red spots" - Scientific American, Feb. 1964 - p.67-68.
- 24) "Luminescent Moon?" - Scientific American, March 1964 - p.56.
- 25) "Luminous: observations of Moon spots" - New Yorker, 20 June 1964 - p.24-26.
- 26) "Lunar eruption" - Science, 13 Feb. 1959 - p.376-377.
- 27) "Lunar luminescence" - Sky & Telescope, Oct. 1964 - p.201.
- 28) Middlehurst, B.M. - "Lunar eruption in 1783?" - Sky & Telescope, Aug. 1964 - p.83-84.
- 29) Middlehurst, B.M. - "Moonquakes and transient events: active lunar processes" - Bulletin of the Atomic Scientists, Dec. 1973 - p.35-41.
- 30) Middlehurst, B.M. & Moore, P.A. - "Lunar transient phenomena: topographical distribution" - Science, 27 Jan. 1967 - p.449-451. (Discussion: 25 Aug. 1967 - p.959-960.)
- 31) "Moon glow will aid in mapping" - Missiles & Rockets, 1 March 1965 - p.25-26.
- 32) "Moon like hollow sphere" - Science News Letter, 22 April 1961 - p.244.
- 33) "Moon volcano may be puff of dust and gas" - Science News Letter, 7 Feb. 1959 - p.88.
- 34) "Moonglow" - Newsweek (US ed), 7 Sept. 1964 - p.57.
- 35) "Moonglow" - Scientific American, Jan. 1972 - p.47.
- 36) Moore, P. - "Color events on the Moon" - Sky & Telescope, Jan. 1967 - p.27.
- 37) Moore, P. - "Linne controversy: a look into the past" - Journal of the British Astronomical Association, v.87, 1977 - p.363-368.
- 38) Moore, P. - "Moonglows" - Omni, Nov. 1978 - p.24.
- 39) "More spots near Aristarchus" - Flying Saucers, June 1965 - p.41-42.

Life in the Solar System: The Moon - Transient Lunar Phenomena (TLP)- Journal Articles (cont)

- 40) Ogilvy, C.S. - "Lights in the Moon" - Popular Astronomy, v.57, (May) 1949 - p.229-233. (Discussion: v.57, 1949 - p.334-355.)
- 41) Pike, R.J. - "Lunar crater Linne" - Sky & Telescope, Dec. 1973 - p.364-366.
- 42) "Radioactivity of Aristarchus" - Sky & Telescope, May 1973 - p.277-278.
- 43) "Red light on the Moon: Westinghouse scientists explain it" - Flying Saucers, June 1967 - p.12.
- 44) Roberts, J.G. - "Lunar activity near Aristarchus" - Flying Saucers, Oct. 1964 - p.70, 72-73.
- 45) "Ruby Moon" - Newsweek (US ed), 30 Dec. 1963 - p.60.
- 46) "Scientists say lunar transients exist but little is known of origin" - Aviation Week & Space Technology, 3 March 1969 - p.58.
- 47) "Spots on the Moon" - Time (US ed), 27 Dec. 1963 - p.54-55.
- 48) Strickland, Z. - "Apollo 12 seismic experiment links red lunar glow to quakes" - Aviation Week & Space Technology, 10 Aug. 1970 - p.57.
- 49) Sullivan, W. - "Scientists differ on causes of flashes on the Moon" - Flying Saucers, April 1968 - p.18.

Life in the Solar System: The Earth

- 1) Bott, H.A. - "Is there life on Earth?" - Fate, Oct. 1962 - p.64-71.
- 2) Lovelock, J.E. - "Earth: living planet" - Omni, July 1980 - p.18, 124.
- 3) Lovelock, J.E. & Whitfield, M. - "Life span of the biosphere" - Nature, 8 April 1982 - p.561-563.
- 4) Margulis, L. & Lovelock, J.E. - "Atmosphere as a circulatory system of the biosphere: the Gaia hypothesis" - Co-Evolution Quarterly, Summer 1975 - p.30-40.
- 5) Pasachoff, J. - "Life on Earth?" - Mercury (Journal of the Astronomical Society of the Pacific), March/April 1978 - p.39.
- 6) Sagan, C. & Mullen, G. - "Earth and Mars: evolution of atmospheres and surface temperatures" - Science, 7 July 1972 - p.52-56.
- 7) Walker, J.C.G. - "How life affects the atmosphere" - BioScience, Sept. 1984 - p.486-491.
- 8) Walker, J.C.G. et.al. - "Negative feedback mechanism for the long-term stabilization of Earth's surface temperature" - Journal of Geophysical Research, v.86, 1981 - p.9776-9782.

Life in the Solar System: Mars (Pre-Viking)

- 1) Edwards, F. - "Soviet scientists claim life on Mars" - Fate, April 1961 - p.40-46.
- 2) Evans, G.H. - "Image orthicon photographs of Martian canals" - Flying Saucer Review, July/Aug. 1966 - p.7-9.
- 3) Evans, G.H. - "Three unsolved Martian mysteries" - Fate, June 1964 - p.27-33.
- 4) "Is there life on Mars?" - Fate, April 1960 - p.27-33; May 1960 - p.27-34.
- 5) Laine, J. - "Gullivers' two moons of Mars" - Fate, Aug. 1957 - p.43-44.
- 6) Liss, J. - "Problem of life on Mars" - Fate, Aug. 1963 - p.39-47.
- 7) Wellman, W. - "Phobos and Deimos: an inquiry" - Flying Saucer Review, May/June 1963 - p.26-27.

Life in the Solar System: Mars (Post-Viking)

- 1) Overbye, D. - "Mystique of Mars" - Discover, Sept. 1984 - p.24-25.

Life in the Solar System: Jovian Planets/Satellites

- 1) Bar-Nun, A. - "Acetylene formation on Jupiter: photolysis or thunderstorms?" - Icarus, May 1979 - p.180-191.
- 2) Ridpath, I. - "Mars may be dead but there's still Jupiter" - New Scientist, 10 March 1977 - p.582.

Extra-Solar Planetary Systems - Book Extracts

- 1) Kumar, S.S. - "Nature of low mass 'dark' companions" (in) - Kumar, S.S. (editor) - Low-Luminosity Stars - Gordon & Breach, N.Y. - 1969 - p.255-257.
- 2) Lippincott, S.L. - "EV Lacertae: is flare activity related to an unseen planet-like companion?" (in) - Activity in Red-Dwarf Stars - D. Reidel, Dordrecht, Holland - 1983 - p.201-202.
- 3) van de Kamp, P. - "Perturbations in stellar paths" (in) - Applications of Modern Dynamics in Celestial Mechanics and Astrodynamics - D. Reidel, Dordrecht, Holland - 1982 - p.45-57.
- 4) van de Kamp, P. - "Search for perturbations in stellar proper motions" (in) - Beer, A. & Strand, K. (editors) - Vistas in Astronomy: Vol.8 - Pergamon Press, N.Y. - 1966 - p.215-218.

Extra-Solar Planetary Systems - Journal Articles

- 1) Angier, N. - "New worlds: hints of other planets" - Time (Aust'n ed), 5 Nov. 1984 - p.119.
- 2) Black, D.C. & Scargle, J.D. - "On the detection of other planetary systems by astrometric techniques" - Astrophysical Journal, v.263, no.2, part 1, 1982 - p.854-869.
- 3) "Dawn of a new solar system?" - Newsweek (US ed), 29 Oct. 1984 - p.133.
- 4) Flint, G. - "Nearing first light at the J.R. Frost Observatory" - Sky & Telescope, May 1984 - p.402-405.
- 5) Hendry, A. - "Stars: speckle search" - Omni, May 1981 - p.132.
- 6) Hecht, J. - "New evidence of distant planets" - New Scientist, 25 Oct. 1984 - p.9.
- 7) Hills, J.G. - "Planetary companions of pulsars" - Nature, v.226, no.5247, 1970 - p.730-731.
- 8) "Planetary system about to form" - Science News, 25 June 1977 - p.404.
- 9) "Planets and glitches" - Science News, v.97, no.9, 1970 - p.222.
- 10) "Pulsar may have a planet" - Science News, v.96, no.17, 1969 - p.370.
- 11) "Sun could be used for detecting other planetary systems" - Star & Sky, Jan. 1980 - p.8, 10.
- 12) "Telescope discovers third solar system" - International Wildlife, May/June 1984 - p.24B.

Exobiology - Bibliographies

- 1) Faprotny, Z. et.al. - "Interstellar travel and communication bibliography: 1984 update" - JHIS, Nov. 1984 - p.502-512.
- 2) Pleasant, L.G. - "Voyager mission and the origin of life: selected references" - Origins of Life, v.12, no.3, 1982 - p.321-329.
- 3) West, M.W. et.al. - "Chemical evolution and the origin of life: bibliography supplements" - Origins of Life, v.7, no.1, 1976 - p.75-85; v.10, no.1, 1980 - p.69-87; v.10, 1980 - p.379-404; v.11, 1981 - p.273-288; v.12, 1982 - p.33-118.

Exobiology - Monographs

- 1) Jastrow, R. - Enchanted Loom: Mind in the Universe - Simon & Schuster, N.Y. - 1981.
- 2) Whewell, W. - On the Plurality of Worlds - Parker, London - 1853.

Exobiology - Book Extracts

- 1) Hartmann, W.K. - "Life: its history and occurrence" (in) - Moons and Planets: An Introduction to Planetary Science - Wadsworth, Belmont, Calif. - 1972 - p.371-393.
- 2) Menzel, D.H. - "Life in the universe" (in) - Astronomy - Random House, N.Y. - 1970 - p.274-278.
- 3) Papagiannis, M.D. - "Report of Commission 51 of the IAU: Search for Extraterrestrial Life" (in) - West, R. (editor) - Transactions of the IAU - D. Reidel, Dordrecht, Holland - 1983 - p.323-329.

Exobiology - Journal Articles

- 1) Allen, G.A. - "'Wise warriors' and the Fermi Paradox" - JBIS, Nov. 1982 - p.520.
- 2) Ball, R. - "Possibility of life on other worlds" - Fortnightly Review, Nov. 1894 - p.718-729.
- 3) Bleksley, A.E.H. - "Life on other worlds" - Monthly Notices of the Astronomical Society of South Africa, v.8, 1949 - p.99-101.
- 4) Cade, C.M. - "Long, cool look at alien intelligences" - Flying Saucer Review, March/April 1967 - p.24-25; May/June 1967 - p.13-15, 19; July/Aug. 1967 - p.15-17; Nov./Dec. 1967 - p.13-15; March/April 1968 - p.7-9.
- 5) Davoust, E. - "In search of intelligent life in the universe" - Postępy Astronautyki (Advances in Astronautics), v.16, no.2, 1983 - p.35-69. (In English)
- 6) Freitas, R.A. - "UFO update: ('E.T.' and extraterrestrial medicine)" - Omni, Sept. 1984 - p.111.
- 7) Friedman, B. - "Millions of inhabited planets" - Flying Saucer Review, May/June 1964 - p.7-10.
- 8) Gallup, G. & Davies, J.C. - "Does human life exist on other planets?" - Fate, Dec. 1972 - p.73-76.
- 9) Krasovskiy, I. - "Astronautics and extraterrestrial civilizations" - Flying Saucer Review, Sept./Oct. 1961 - p.3-5.
- 10) Mendillo, M. & Hart, R. - "Note on the rarity of solar eclipses and the existence of extraterrestrial life" - Physics Today, Feb. 1974 - p.73.
- 11) Miller, E.C. & Smith, J.L. - "Some considerations regarding the possibility of contact with intelligent extraterrestrial beings" - BUFOFA Journal & Bulletin, Winter 1964 - p.4-7.
- 12) Milne, E. & Ortega, P. - "Cosmic bestiary" - Omni, Sept. 1984 - p.94-99.
- 13) Molton, P.M. - "Extraterrestrial biology" - Spaceflight, Oct. 1972 - p.398.
- 14) Ovenden, M.W. - "Life and the universe" - Illustrated London News, 21 Jan. 1961 - p.98-99.
- 15) Ovenden, M.W. - "Life on other planets" - Illustrated London News, 25 March 1961 - p.496-497.
- 16) Rogo, D.S. - "Extraterrestrial sex" - Omni, Sept. 1984 - p.112.
- 17) Ross, J.C. - "Scientist looks at life on other worlds" - Fate, April 1959 - p.86-89.

14.

Exobiology - Journal Articles (cont)

- 18) Sharp, P.F. - "Search for life beyond the Earth" - Flying Saucer Review, Nov./Dec. 1961 - p.12-15.
- 19) Smith, S.L. - "Problems of exobiology" - BUFOFA Journal & Bulletin, Winter 1965 - p.13-16; Spring 1966 - p.13-18; Summer 1966 - p.10-14.
- 20) Stephens, B. - "Is anyone out there?" - Stardust (Royal Astronomical Society of Canada), Dec. 1982/Jan. 1983 - p.4-12.
- 21) Zarowitz, W. - "Are we alone?" - Cornell Engineer, v.37, no.5, 1972 - p.6-9.

Exobiology - Historical Aspects

- 1) Brooke, J.H. - "Natural theology and the plurality of worlds: observations on the Brewster-Whewell debate" - Annals of Science, v.34, 1977 - p.221-286.

Exobiology - Exotic/Extreme Life Forms/Environments

- 1) Drake, W.R. - "Is our sun inhabited?" - Flying Saucer Review, Nov./Dec. 1959 - p.15-17.
- 2) Forward, R.L. - "Alien in our seas" - Omni, May 1981 - p.106-108, 116.
- 3) Franklin, D. - "New bug comes in from the cold" - Science News, 28 July 1984 - p.55.
- 4) Gillett, S.L. - "Those halogen breathers" - Analog, Oct. '84 - p.60-70.
- 5) Lewin, R. - "Exotic bacterium unravels energy problems" - New Scientist, 1 April 1976 - p.28-29.
- 6) "NASA biologists discover rare Earth organism" - Space World, Jan. 1974 - p.33.
- 7) "Purple salt-lover captures the sun" - Science News, 6 March 1976 - p.149.

SETI/CETI - Book Extract

- 1) Clarke, A.C. - "Across the abyss" (in) - Promise of Space - Pyramid, N.Y. - 1970 - p.319-325.

SETI/CETI - Journal Articles

- 1) Dye, C. - "Radio to other worlds" - Fate, March 1955 - p.98-96.
- 2) Elliott, G. - "Mysterious radio signals" - Flying Saucer Review, March/April 1969 - p.29-30.
- 3) Fisher, A. - "New search for life in space" - Popular Science, Oct. 1934 - p.44, 53-55, 58, 60.
- 4) "International review meeting on communication with extraterrestrial intelligence" - Acta Astronautica, Dec. 1973 - p.409-456.
- 5) Miller, M.B. - "Scientists track space radio signals" - Fate, June 1959 - p.57-58.
- 6) Molton, P.M. - "SETI: the bottom line" - Space World, May 1984 - p.2.
- 7) Moore, P. - "Speaking English in space" - Omni, Nov. 1979 - p.26.
- 8) "No signs of little green men ... but US scientists urge that search should continue" - New Scientist, 17 March 1977 - p.645.
- 9) O'Leary, B. - "Stars: 'he has hemorrhoids'" - Omni, March 1981 - p.145.
- 10) Parlour, R. - "Undesirable aliens" - Astronomy, July 1984 - p.26+.
- 11) Shvartsman, V.F. - "Is man conducting a proper search for his brothers in intelligence?" - Sputnik, no.2, 1984 - p.50-53.
- 12) Subotowicz, M. - "Space radiotelescope with the unfilled aperture for CETI, SETI and astronomy" - Postępy Astronautyki (Advances in Astronautics), v.14, no.3, 1981 - p.7-34. (In English)

SETI/CETI - Journal Articles (cont)

- 13) "Why we should encourage distant meetings of an extraterrestrial type" - New Scientist, 13 April 1978 - p.68.

Non-Radio SETI: Astroengineering

- 1) Kepler, J. - "Astral architecture: the reconstruction of the solar system will be only the beginning" - Future, Feb. 1979 - p.26-27.
- 2) Stevens, C.J.R. - "On the stability of species and the feasibility of astroengineering over long time periods" - JBIS, Nov. 1982 - p.520.

Non-Radio SETI: Neutrinos & Tachyons

- 1) Sheffield, C. - "Space phones" - Omni, Sept. 1984 - p.102-104, 138.

Cosmic Truths & Consequences - Book Extracts

- 1) Bainbridge, W.S. - "Religions for a galactic civilization" (in) - Emme, E.M. (editor) - Science Fiction and Space Futures: Past and Present - Univelt, San Diego, Calif. - 1982.
- 2) Carter, B. - "Large number coincidences and the anthropic principle in cosmology" (in) - Longair, M.S. (editor) - Confrontation of Cosmological Theories With Observational Data - D. Reidel, Dordrecht, Holland - 1974 - p.291-298.

Cosmic Truths & Consequences - Journal Articles

- 1) Crenshaw, J. - "What can we expect of 'civilization' in outer space?" - Fate, Jan. 1967 - p.79-89.
- 2) Thomas, D. - "Anthropology of space" - AIAA Student Journal, Winter 1977 - p.12-16.
- 3) Wallace, A.R. - "Man's place in the universe" - Fortnightly Review, v.73, 1903 - p.395-411. (Discussion: v.74, 1903 - p.380-390.)

Astro-Archaeology - Monograph

- 1) Williamson, R.A. - Living the Sky: The Cosmos of the American Indian - Houghton Mifflin, Boston - 1984.

Astro-Archaeology - Journal Articles

- 1) McAuliffe, K. - "Explorations: modern megalith" - Omni, Aug. 1981 - p.118, 120.
- 2) Thomsen, D.E. - "What mean these African stones?" - Science News, 15 Sept. 1984 - p.168-169, 174.

Archaeological Mysteries

- 1) Patton, R. - "Ooparts" - Omni, Sept. 1982 - p.52-55, 58, 104-105.
- 2) Starr, D. - "Plastic megaliths" - Omni, Feb. 1983 - p.50-52, 91-92.

Ancient Astronauts

- 1) Rosen, D. - "'Manna Machine' by G. Sassoon & R. Dale: review" - New Scientist, 29 June 1978 - p.924.
- 2) Sassoon, G. & Dale, R. - "Deus est machina?" - New Scientist, 1 April 1976 - p.22-24.

UFOs - Monographs

- 1) Brookesmith, P. (Editor) - Age of the UFO - Orbis, London - 1984.
- 2) Fawcett, L. & Greenwood, B.J. - Clear Intent: The Government Cover-Up of the UFO Experience - Prentice-Hall, Englewood Cliffs, N.J. - 1984.
- 3) Randles, J.C. - UFO Reality: A Critical Look at the Physical Evidence - Hale, London - 1983

15.

UFOs - Monographs (cont)

- 4) Taylor, F. - Uninvited II: The Visitation - Star, London - 1984.

UFOs - Book Extract

- 1) Dong, P. - "First mystery: UFOs" (in) - Four Major Mysteries of Mainland China - Prentice-Hall, Englewood Cliffs, N.J. - 1984 - p.1-74.

UFOs - Journal Articles (Pre-1977)

- 1) Scully, F. - "Air Force asked twenty questions" - Variety, 11 Jan. 1950.
- 2) Scully, F. - "Flying saucers dismantled, secrets may be lost" - Variety, 23 Nov. 1949.
- 3) Scully, F. - "One flying saucer lands in New Mexico" - Variety, 12 Oct. 1949.

UFOs - Journal Article (1977-1982)

- 1) Clark, J. & Macki, C. - "Conversation with Dr. J. Allen Hynek" - Qui, April 1977.

UFOs - Journal Articles (1983+)

- 1) Carelik, G. - "Great Hudson Valley UFO mystery" - Discover, Nov. 1984 - p.18-20, 22-24.
- 2) McCabe, C. - "UFO update:(the Delphos, Kansas CE2 controversy)" - Omni, Oct. 1984 - p.135.
- 3) Mishara, E. - "Soviet UFO commission" - Omni, Sept. 1984 - p.114.
- 4) Randles, J.C. - "Alien reject" - Omni, Oct. 1984 - p.136.

UFOs - Social Aspects

- 1) "Psychological need for flying saucers" - Discover, Nov. 1984 - p.22-23.

UFOs - Condon Study

- 1) "Scientific look at UFOs" - Discover, Nov. 1984 - p.24.

UFOs - Novelty Items

- 1) Garver, R.G. - Saucer People (fiction) - Meador, Boston - 1957.

UFOs - Miscellaneous Aspects - Monograph

- 1) Minnaert, M. - Nature of Light & Color in the Open Air - Dover, N.Y. - 1954.

UFOs - Miscellaneous Aspects - Journal Articles

- 1) Baker, S. - "Phantom mushroom (cloud)" - Omni, Oct. 1984 - p.138.
- 2) Bessor, J.P. - "Mysterious lights of Australia" - Fate, Aug. 1953 - p.87-90.
- 3) Geier, C.S. - "Ghost light of Hornet" - Fate, April 1956 - p.58-61.
- 4) Lemonick, M. - "Science at the fringe" - Omega, Sept./Oct. 1984 - p.7. (Also in: Science Digest, May 1984 - p.38.)
- 5) Windes, V.M. - "Flying rocks and bouncing lights in Llano, New Mexico" - Fate, Nov. 1967 - p.96-99.

Ball Lightning - Book Extract

- 1) Powell, J.R. & Finkelstein, D. - "Structure of ball lightning" (in) - Landsberg, H.E. & van Mieghen, J. (editors) - Advances in Geophysics - Academic Press, N.Y. - 1969.

Ball Lightning - Journal Articles

- 1) Cade, C.M. - "Fireballs and flying saucers" - Flying Saucer Review, Jan./Feb. 1967 - p.10-12.
- 2) Charman, W.N. - "Ball lightning" - Physics Reports, v.54, no.4, 1979 - p.261-306.

Ball Lightning - Journal Articles (cont)

- 3) Galus, H.S. - "Mystery of the crawling fireballs" - Fate, Feb./March 1952 - p.37-40.
- 4) Hunt, R. - "Canadian fireballs" - Flying Saucer Review, March/April 1966 - p.33-34.
- 5) Lauritzen, H. - "Flying saucers - super-conducting whirls of plasma" - Flying Saucers, March 1967 - p.10-11.

Tunguska, Siberia Explosion (1908)

- 1) Dempster, D. - "Does Siberia hold the proof?" - Flying Saucer Review, Jan./Feb. 1962 - p.4-6.
- 2) Edwards, F. - "Did a space ship explode over Siberia?" - Fate, Oct. 1959 - p.44-51.
- 3) "Little spaceship that wasn't" - Discover, Oct. 1984 - p.8.

Bermuda Triangle

- 1) "Bermuda Triangle vanishes down a whirlpool" - New Scientist, 9 March 1978 - p.641.
- 2) "Deadly Bermuda Triangle" - Flying Saucer Review, July/Aug. 1964 - p.14-17.
- 3) "Soviets lost in Bermuda Triangle" - New Scientist, 5 Jan. 1978 - p.6.

Cryptozoology: Chinese Bigfoot - Book Extract

- 1) Dong, P. - "Fourth mystery: wildman" (in) - Four Major Mysteries of Mainland China - Prentice-Hall, Englewood Cliffs, N.J. - 1984 - p.171-203.

Cryptozoology: Chinese Bigfoot - Journal Article

- 1) Lawren, B. - "Bigfoot preserve" - Omni, Sept. 1984 - p.112.

Cryptozoology: Loch Ness Monster

- 1) "Skeptical eye: the (retouched) Loch Ness Monster" - Discover, Sept. 1984 - p.6.

Dolphin Intelligence/Communication

- 1) Fuller, C. - "Porpoise research: exploring an alien intelligence" - Fate, Nov. 1963 - p.52-60.

Artificial Intelligence - Monographs

- 1) Davis, R. & Lenat, D. - Knowledge-based Systems in Artificial Intelligence - McGraw-Hill, N.Y. - 1982.
- 2) Michie, D. & Johnston, R. - Creative Computer: Machine Intelligence and Human Knowledge - Viking, N.Y. - 1984.
- 3) O'Shea, T. & Eisenstadt, M. (Editors) - Artificial Intelligence: Tools, Techniques and Applications - Harper & Row, N.Y. - 1984.
- 4) O'Shea, T. & Self, J. - Learning & Teaching With Computers: The Artificial Intelligence Revolution - Prentice-Hall, Englewood Cliffs, N.J. - 1983.
- 5) Rose, F. - Into the Heart of the Mind: An American Quest for Artificial Intelligence - Harper & Row, N.Y. - 1984.
- 6) Simon, H.A. - Sciences of the Artificial - 2nd ed - MIT Press, Cambridge, Mass. - 1981.
- 7) Warring, R.H. - Robots and Robotology - Lutterworth Press, Guildford, Surrey, England - 1983.
- 8) Winston, P.H. - Artificial Intelligence - MIT Press, Cambridge, Mass. - 1982. (2nd ed - Addison-Wesley, Reading, Mass. - 1984.)

Artificial Intelligence - Book Extracts

- 1) Buchanan, B.G. - "Artificial intelligence: toward machines that think" (in) - Encyclopaedia Britannica Yearbook of Science and the Future: 1985 - Encyclopaedia Britannica, Inc., Chicago, Illinois - 1984 - p.98-111.
- 2) Newell, A. - "Artificial intelligence" (in) - Parker, S.P. (editor) - McGraw-Hill Encyclopedia of Electronics and Computers - McGraw-Hill, N.Y. - 1984 - p.71-74.

Artificial Intelligence - Journal Articles

- 1) Alexander, T. - "Why computers can't outthink the experts" - Fortune, 20 Aug. 1984 - p.99-100, 102, 104, 106, 108.
- 2) Anderson, A. - "Fifth generation computers: Japan finds rivals treading uncomfortably close" - Nature, 22 Nov. 1984 - p.295.
- 3) Anderson, I. - "'AI is stark naked from the ankles up'" - New Scientist, 15 Nov. 1984 - p.18-21.
- 4) "Artificial intelligence is here" - Business Week (US ed), 9 July 1984 - p.54-57+. (International ed - 9 July 1984 - p.52-57, 60.)
- 5) "Artificial it is, intelligent it isn't" - New Scientist, 8 Nov. 1984 - p.2.
- 6) Barnouw, D. - "'Melancholy here now': artificial and alien intelligence" - Science-Fiction Studies, Nov. 1983 - p.333-340.
- 7) Cole, K.C. - "Kristina Hooper: building bridges for the brain" - Discover, June 1984 - p.74-77+.
- 8) "Fifth-generation computers: the race is still open" (+) "Cogito, ergo er..." - Economist (British), 17 Nov. 1984 - p.88, 93.
- 9) Forbes, P. - "Silicon solution" - New Scientist, 8 Nov. 1984 - p.43.
- 10) Goleman, D. - "Human-computer connection" - Psychology Today, March 1984 - p.20-24.
- 11) Johnstone, B. - "Japan unveils its fifth-generation" - New Scientist, 8 Nov. 1984 - p.10-11.
- 12) Lamb, J. - "Peace and love in the computer jungle" - New Scientist, 22 Nov. 1984 - p.17-20.
- 13) Marbach, W.D. et.al. - "Smarter computer" - Newsweek (US ed), 3 Dec. 1984 - p.89-91B.
- 14) McAuliffe, K. - "Biochip revolution" - Omni, Dec. 1981 - p.52-56, 58.
- 15) Rose, F. - "Pandora project" - Esquire, July 1984 - p.64-66+.
- 16) Sinclair, G. - "Dialogues on America's future: computers will replace human intelligence" - Vital Speeches of the Day, 1 June 1984 - p.489-491.
- 17) Stine, G.H. - "Bionic brain" - Omni, July 1979 - p.84-86, 121-122.
- 18) Waldrop, M.M. - "Fifth generation: taking stock" - Science, 30 Nov. 1984 - p.1061-1063.
- 19) Waldrop, M.M. - "Intelligence of organizations" - Science, 14 Sept. 1984 - p.1136-1137.
- 20) Zadeh, L.A. - "Making computers think like people" - IEEE Spectrum, Aug. 1984 - p.26-32.

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